UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

October 15, 2003

Mr. Chuck McLaughlin
OPOG Project Coordinator
de Maximis, Inc.
5225 Canyon Crest Drive, Building 200, Suite 253
Riverside, CA 92507

RE: Draft Report Addendum for Additional Data Collection in the Phase 1a Area
Omega Chemical Superfund Site, Whittier, CA, dated June 27, 2003

Dear Mr. McLaughlin:

EPA received the subject document, prepared by Camp Dresser & McKee (CDM) in accordance with Consent Decree No. 00-12471 between EPA and the Omega Chemical Site PRP Organized Group (OPOG). The report covers field data collection activities that included well installation, aquifer testing, and groundwater sampling. The results of laboratory analyses, aquifer test analyses, and assessment of contaminant fate and transport are also discussed.

EPA comments are attached. Written responses are welcome but not required, although EPA comments should be incorporated into future data collection activities and subsequent versions of the report. At your convenience, EPA is also available to discuss the comments by conference call. If you have any questions, please call me at (415) 972-3149.

Sincerely,

Chris Lichens
Superfund Project Manager

Enclosure

cc: Sharon Wallin/Dave Chamberlin, CDM
Lori Parnass, CDTSC

Enclosure 1

EPA comments on the "Draft Report Addendum for Additional Data Collection in the Phase 1a Area" for the Omega Chemical Superfund Site, dated June 27, 2003.

General Comments

1. The report should provide additional information regarding groundwater sampling and aquifer testing procedures. The interpretive sections should be expanded and the wording of some discussions revised. These issues are addressed by specific comments that follow.

2. The report presents new hydrogeologic and contaminant distribution data. Lithologic cross sections should be prepared and included in the report for the benefit of the discussion in the text. The cross sections should also show groundwater elevations and contaminant concentrations.

3. The argument for natural degradation of contaminants of concern in groundwater at the site is well established. However, the text should be revised where it states that *data demonstrate the contaminants attenuate with depth (or distance),* or that *attenuation was observed.* Generally, attenuation of contaminants is not *observed* in field conditions. The natural attenuation processes can be only indirectly inferred. The text also seems to misapply the term *attenuation*, which usually relates to natural attenuation processes (such as degradation, sorption, and dilution), to the characterization of the spatial extent of the contamination, which may also be controlled by other factors. The text should clearly distinguish between processes that limit the extent of contamination.

4. The conclusions regarding co-mingling with a plume originating from an off-site source are too strong for the supporting data available. The elevated contaminant concentrations measured in groundwater samples from downgradient wells might also be explained by alternate contaminant migration pathways and contaminant distribution within the plume. The aquifer is heterogeneous and the release of contamination into the subsurface was likely time varying; as a result, the contaminant distribution is expected to be non-uniform. Additional supporting information would be necessary to verify the contribution from a potential off-site source.

Specific Comments

1. Page 2-1. The text should present the following information:
- type/model of pump used
- which wells were monitored as observation wells
- duration and results of pre-test water level monitoring
- frequency of flow rate monitoring
- how flow rate was measured (using an in-line flow totalizer?)
- whether manual water level readings were used to confirm transducer recordings

2. Page 2-3, 1st paragraph. The text refers to sampling procedures: "... as previously described in section 2.1.1..." Section 2.1.1 discusses groundwater sampling during aquifer testing. The text

should identify the sampling methodology used (e.g., low-flow, micro-purge, 3-well volume purging, etc.).

3. Page 2-3. The report should identify the direct reading instrument used (make, model).

4. Page 2-4. The second to last paragraph on page 2-4 describes the use of dedicated tubing and a portable submersible pump. The sampling procedures should be described in this section; possibly under a separate sub-heading.

5. Page 2-4. The text should identify analytical methods used for nitrate/nitrite, dissolved oxygen, methane/ethane/ethene, hexavalent chromium, 1/4-dioxane, and perchlorate.

6. Section 3. Lithologic cross sections should be constructed to illustrate the discussion of the alluvial channel, fine-grained material above the water table, depth and horizontal extent of contamination, and heterogeneity of the subsurface soils. Two cross sections, one along the groundwater flow path (approximately extending from OW-1 to OW-4) and one nearly perpendicular to the groundwater flow (approximately extending from OW-2 to OW-3, or H7 to H11), should be included at a minimum.

7. Page 3-2, Section 3.3.1. Well construction is presented in Table 3-1 rather than Table 3-3.

8. Section 3.3. The report should present time-series graphs for selected compounds. As a suggestion, the time series could be effectively shown as a figure insert because the Phase 1a area includes only eight wells.

9. Page 3-3. Third paragraph. The last sentence should be revised. The data do not "*demonstrate* attenuation of the contaminants with depth". Rather, they indicate a limited vertical extent; see general comment 3.

10. Page 3-4, Washington Blvd. Wells, first paragraph. The statement "...chlorinated VOC concentrations, therefore, were observed to attenuate..." should be revised; see general comment 3.

11. Page 3-5, First paragraph. The statement: "...attenuate with increased depth..." should be replaced with wording such as "data indicate that the vertical extent of contamination is limited". See general comment 3.

12. Page 3-6, section 3.3.4, last paragraph. The statement "...were observed to attenuate..." should be revised. See general comment 3.

13. Page 3-8, section 3.4.1, last paragraph. Another explanation of the increased concentration is that a cross-gradient portion of the plume was tapped via a preferential groundwater flow pathway, such as the sand channel, due to the changed flow field during the test.

14.Page 3-9. The correct spelling of the name of the software used is AQTESOLV. The text

should cite the references for the software and the methods used.

15. Page 3-9, second paragraph. The text should clarify the rationale for performing the analysis by both manual and computer-assisted straight-line fitting. The graphs in Appendix E seem to show that manually recorded drawdown was used in the manual fitting and pressure transducer data were imported into AQTESOLV. The AQTESOLV plots also seem to be the results of manual straight-line matching as opposed to linear regression (it is noted that linear regression should not be used for the presented test data).

As noted in comment 1, the report should discuss how the manual drawdown data compare to the electronically recorded drawdowns. Typically, the manual readings are taken as a backup and, for long-term tests, to correct for transducer drift (this likely was not a concern for the short-term tests). Discrepancies, if any, between the manually and electronically collected time-drawdown data should be resolved.

The difference between the results of the analysis of manually and electronically collected data may simply result from different values of drawdown measured and different duration of manual and transducer recording.

16. Page 3-9. The assumptions for the Theis method can be included by reference. It would suffice to state that an unconfined aquifer response is identical to that of a confined aquifer during early pumping.

17. Page 3-9, section 3.4.2. The Theis method and its straight-line approximations are applicable to observation well drawdown. If they are used for analyzing the pumping well drawdown, effects of wellbore storage, skin, and well loss, as well as variable extraction rate need to be considered. The method can still yield useful results. The text should state how these issues were addressed.

Methods other than the Theis method should be considered. For example, the Papadopulos and Cooper method (Papadopulos, I.S. and H.H. Cooper, 1973. Drawdown in a well of large diameter, Water Resources Research, volume 3, pages 241-244.) accounts for wellbore storage and the Moench's well function (Moench, A.F., 1997. Flow to a well of finite diameter in a homogeneous, anisotropic water table aquifer.Water Resources Research, volume 33, number 6, pages 1397-1407; Moench, A.F., 1998. Correction to "Flow to a well of finite diameter in a homogeneous, anisotropic water table aquifer" by Allen Moench. Water Resources Research, volume 34, number 9, pages 2431-2432) accounts for the wellbore storage, skin, partial penetration, and unconfined aquifer.

It is generally more appropriate to select one well function based on the type of the well and aquifer response, length of the test, quality of data, and other information. If multiple methods, such as Theis and Cooper-Jacob, are used, the report should discuss the reasons for the difference between their results. A similar approach applies to the analysis of recovery data. Note that curve-fitting methods can be simultaneously applied to both the pumping and recovery. The report should discuss the quality of fit and select the method considered the most representative

of the test conditions, rather than using an average without further discussion.

The comment should not be construed as requesting that the aquifer test analysis be excessively detailed. The test data allow only a limited analysis.

18. Page 3-1, section 3.2. The text should discuss groundwater flow gradient, its change in time and distance across the site. Hydrographs should be presented and seasonal groundwater elevations discussed. If such data are not available, the text should say so.

19. Page 3-11, section 3.5. The text should briefly summarize the results of the data validation.

20. Section 4. The aquifer test results should be included in the conclusions.

21. Page 4-1, section 4.1.1. The text should discuss the groundwater flow gradient and seasonal fluctuations.

22. Page 4-1, section 4.1.2. The text "...observed to attenuate with depth..." should be replaced with wording such as "...indicate limited vertical extent..."; see general comment 3.

The text states that contaminants "attenuate with increased distance downgradient" of the source. It is expected that the contaminant concentrations decrease with distance from the source area. However, the report should note that the flowpaths are likely tortuous. As a result, the magnitude of the change in contaminant concentrations with distance from the source is uncertain.

23. Page 4-1, section 4.1.3. The text should present an estimate of the advective velocity and discuss the contaminant migration rate.

24. Page 4-1, section 4.1.3. The text should discuss the source of contamination measured in groundwater samples from well OW7.

25. Page 4-1, section 4.1.3. The text should discuss the presence of acetone; it appears to follow a different pathway than PCE and TCE contamination.

26. Page 4-2, second paragraph. The text should note that wells OW1, OW8, OW4, and OW5 are only approximately located along a flow line. Considering the heterogeneity of the shallow aquifer, especially the presence of sand channels, the flow lines are likely tortuous; as a result, the wells in each pair may not lie on the same flow line.

27. Page 4-2, third paragraph. The ratios of concentrations are a good indication of the degradation of the contaminants and provide a convincing argument that natural degradation of chlorinated compounds is occurring at the site.

Co-mingling with another plume is possible; however, the report should mention that the increased concentrations in the downgradient wells can also be explained by tortuous migration pathways and non-uniform contaminant distribution in the aquifer. Additional data may clarify

whether the plume is co-mingling with off-site contamination.

28. Section 4.2. The recommendation regarding extraction well type in the first sentence seems to be out of context. Discussion of a proposed remedy is premature.

29. Section 4.2. Direct push techniques are the most efficient way to map the lithology and contaminant distribution in the shallow subsurface at the site. However, installation of additional permanent wells is necessary to allow routine sampling and better depth control of the groundwater samples.

The report states (on page 4-2) that the high concentrations of PCE, up to 50% of its aqueous solubility, are an indication of the presence of dense non-aqueous phase liquid (DNAPL) in the source area. The distribution of DNAPL at the site should be characterized. A direct push method, such as membrane interface probe (MIP) in combination with cone penetrometer testing (CPT) can be used, followed by soil and liquid sampling, and well installation. It is noted that subsequent to completion of the draft report, CDM has indicated that MIP will be used at the site.

The possibility of DNAPL presence below the shallow groundwater zone must also be addressed so that the remedy can mitigate this (i.e., source reduction should be part of the remedy). The vertical extent of contamination and potentially also the vertical extent of DNAPL need to be characterized. Because DNAPLs can migrate through fine-grained soils, aquifer zones below the screen interval of well OW1 may have been impacted. It is recognized that drilling through a potential pool of DNAPL should be avoided to prevent the creation of a possible artificial migration pathway along the borehole. Following the MIP investigation, a new well should be installed downgradient of OW1 (or of the location where the presence of DNAPL is most suspected). Telescopic well construction should be considered to prevent cross-contamination of deeper aquifer zones. The new well screen should be placed at a depth interval below the OW1 screen. Installation of a multi-level completion well (such as two 2-inch diameter wells in one borehole) should be considered. The goal will be to establish the lower vertical limit of the contamination and to characterize the aquifer lithology at that depth.

30. Appendix E. It is noted that the recorded recovery period was short, less than 30 minutes. Longer and more complete recovery is desireable.

Consistent units should be used throughout the report. Some plots show transmissivity units as gal/day/foot.

The straight fit line for the Theis recovery method should pass through intercept 1.0 on the t/t'axis in plots E-7, E-13, and E-16. These data show the effects of wellborage and possibly low permeability skin, as well as incomplete recovery.

It is unclear why the values on the y-axis are increasing downward on the time-drawdown plots (i.e., are the plots upside down?). Drawdown is treated as a positive quantity.

31. Proposed Additional Investigation in the Phase 1a Area, October 13, 2003 memorandum.

Note that 36,000 gallons of water will be generated for the planned pumping rate and test duration and one 20,000 gallon tank will not suffice.

The duration of recovery after the pumping stops should be specified.

The construction of the two planned piezometers (depth, screen length, sand pack, seal) should be specified.

It is suggested that permanent or temporary piezometers be considered also for the two remaining borings to take advantage of the boreholes and collect additional drawdown data during the pumping test. The piezometer screens may be installed at different depths.

Data Validation Comments.

1. Data validation reports presented in Appendix G are according to EPA functional guidance and present a comprehensive review of the specific batch covered by the report.

2. Full laboratory data packages corresponding to the data validation reports are needed for the EPA review. The report currently presents limited laboratory data; due to the size of the full packages these may need to be presented separately.

3. A full listing of the sample delivery groups is required, along with a description of the methodology used to select the 10% for validation.

4. A description of how the data were flagged for final reports is required. Were data validation/data review flags incorporated?

5. For data comparability and establishing contamination trends, data flagging should incorporate the following:

- For the database at large, a consistent level of flagging needs to be implemented. If the data flags were limited to the 10% of the data selected for validation, this would not provide for data consistency or comparability. The level of flagging must be detailed. For 90% of the data that is not being validated, flagging can be based on QC data summaries to include calibration and other internal standards rather than just accuracy/precision/blank data. This would provide qualification needed for project decisions, particularly at low levels or concentrations close to levels of concern.
- For data comparability, data validation flags could simply be based on control limits without reviewer's professional judgement to eliminate differences; e.g., Method 8260 data validation report section VI for OC-GW-OW1-02193, OC-GW-OW2-02193, OC-GW-OW1B-02193.